



Fisheries and Oceans
Canada

Pêches et Océans
Canada

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August 22, 2016

Your file Votre référence

Our file Notre référence
15-HPAC-01160

Brent Mossop
British Columbia Hydro and Power Authority
Four Bentall Centre, 1100-1055 Dunsmuir Street
PO BOX 49260
Vancouver, BC V7X 1V5

Dear Mr. Mossop,

Re: Reissuance of *Fisheries Act* Authorization

On July 27, 2016, Fisheries and Oceans Canada (DFO) issued BC Hydro an authorization pursuant to paragraph 35(2)(b) of the *Fisheries Act* for the Site C Clean Energy Project Main Civil Works and Facility Operations (the Project). DFO hereby reissues the authorization for the Project to BC Hydro to correct minor errors contained in the July 27, 2016 authorization.

The enclosed re-issued authorization replaces and annuls the July 27, 2016 authorization in its entirety. The authorization should be kept on site while work is in progress, and work crews should be familiar with, and able to adhere to, the conditions of the authorization.

Failure to comply with any of the terms or conditions of the attached authorization may lead to prosecution under the *Fisheries Act*.

If you have any questions, please contact Brian Naito by phone at 604-790-4260 or by email at Brian.Naito@df-mpo.gc.ca. Please reference the file number above when corresponding with the Department.

Yours sincerely,



Rebecca Reid

Attachment: Reissued Paragraph 35(2)(b) *Fisheries Act* authorization dated August 22, 2016

Canada



**REISSUED PARAGRAPH 35(2)(b) FISHERIES ACT AUTHORIZATION
DATED AUGUST 22, 2016**

This Authorization is a reissuance to BC Hydro and Power Authority of the authorization issued to BC Hydro and Power Authority on July 27, 2016. Reissuance is necessary in order to correct errors contained in the authorization issued on July 27, 2016. The errors and changes (underlined) are as follows:

Reference in Authorizations	Phrasing and/or text in Authorization issued July 27, 2016	Revisions included in this Authorization
1. Condition 3.2	“Monitoring of avoidance and mitigation measures: The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in <u>section 2</u> of this authorization and provide a Quarterly monitoring report to DFO by March 31 st , June 30 th , September 30 th , and December 31 st respectively of each year unless otherwise agreed to by DFO.”	“Monitoring of avoidance and mitigation measures: The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in <u>Condition 2</u> of this authorization and provide a Quarterly monitoring report to DFO by March 31 st , June 30 th , September 30 th , and December 31 st respectively of each year unless otherwise agreed to by DFO.”
2. Condition 3.2.3	Demonstrating effective implementation and functioning of avoidance and mitigation measures: Providing dated photographs and inspection reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the serious harm to fish associated with each work, undertaking or activity <u>is</u> covered by this authorization	Demonstrating effective implementation and functioning of avoidance and mitigation measures: Providing dated photographs and inspection reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the serious harm to fish associated with each work, undertaking or activity covered by this authorization
3. Condition 5.4	“Contingency offsetting measures: If the results of monitoring as required in condition 6 indicate that the offsetting measures are not constructed by September 30, 2022 and/or are not functioning according to the criteria in <u>4.2</u> above and/or in Section 9.13 of the Application for Authorization, the Proponent shall give written notice to DFO and shall implement the following contingency measures to ensure the implementation of the offsetting measures is completed and/or functioning as required by this authorization:”	“Contingency offsetting measures: If the results of monitoring as required in condition 6 indicate that the offsetting measures are not constructed by September 30, 2022 and/or are not functioning according to the criteria in <u>5.2</u> above and/or in Section 9.13 of the Application for Authorization, the Proponent shall give written notice to DFO and shall implement the following contingency measures to ensure the implementation of the offsetting measures is completed and/or functioning as required by this authorization:”



4. Condition 5.4.1	“Additional main channel contouring and/or side channel enhancements in the Peace River similar to those described in subsection 4.2.1 and 4.2.2 of this authorization;”	“Additional main channel contouring and/or side channel enhancements in the Peace River similar to those described in subsection 5.2.1 and 5.2.2 of this authorization;”
5. Condition 6.0	“Conditions that relate to monitoring and reporting of implementation of offsetting measures (described above in section 5)”	“Conditions that relate to monitoring and reporting of implementation of offsetting measures (described above in Condition 5)”
6. Condition 7.2	“With the goal of supporting meaningful engagement and information sharing about the Project activities with Aboriginal groups (as defined under ‘General Conditions’, the Proponent, in consultation with”	“With the goal of supporting meaningful engagement and information sharing about the Project activities with Aboriginal groups (as defined under ‘General Considerations’, the Proponent, in consultation with”
7. Page numbers in the Authorizations	The page numbers in this Authorization have been updated from the July 27, 2016 authorization.	

Authorization issued to

British Columbia Hydro and Power Authority (*hereafter referred to as the "Proponent"*)

Attention: Brent Mossop, Fisheries and Aquatic Lead, Site C Clean Energy Project

Four Bentall Centre
1100-1055 Dunsmuir Street
PO BOX 49260
Vancouver, BC V7X 1V5

Location of Proposed Project

Nearest community (city, town, village): Fort St. John
Municipality, district, township, county: Peace River Regional District
Province: British Columbia
Name of watercourse, waterbody: Peace River and associated tributaries
Longitude and latitude: 56° 11'42" N 120° 54' 51" W

Description of Proposed Project

The proposed project of which the authorized works, undertakings or activities form a part involves:

- Construction of the dam, generating station and spillways, and certain ancillary works consisting of a permanent network of site roads, site drainage and debris handling facilities;
- Clearing of the area to be flooded upon creation of the reservoir;
- Construction of the Hudson’s Hope shoreline protection and the Highway 29 realignment east of Lynx Creek;
- Filling of the reservoir (*hereafter “Reservoir Filling”*); and
- Operation of the hydroelectric facility (*hereafter “Facility Operation”*).



Description of Authorized works, undertakings or activities likely to result in serious harm to fish

The works, undertakings, or activities associated with the proposed project described above, that are likely to result in serious harm to fish, are:

1. Stage 1 Cofferdams
 - Construction of the north bank cofferdams on the Peace River at the location of the dam site; and
 - Construction of the diversion inlet and outlet cofferdams and channels.
2. Stage 2 Cofferdams
 - Installation of the rockfill berm and the upstream and downstream cofferdams in the Peace River mainstem that will block river flows and allow for construction of the earthfill dam; and
 - Construction of the diversion closure cofferdam to cease operation of the diversion tunnels when reservoir filling is nearing completion.
3. River Diversion
 - Diversion of Peace River flow through the diversion tunnels, and creation of an approximately 18km long headpond upstream of the dam site.
4. Moberly River Construction Bridge
 - Infill associated with installation of a crossing over the Moberly River.
6. Earthfill Dam
 - Construction of the earthfill dam in the isolated area of the Peace River channel between the upstream and downstream Stage 2 cofferdams.
7. Relocated Surplus Excavated Material (RSEM) Sites
 - Construction of RSEMs L5 and L6 to store excavated material from construction activities that is surplus or unsuitable for construction.
8. Highway 29 Realignment
 - Infilling below the high water mark along the north bank of the Peace River east of Lynx Creek to construct the Highway 29 realignment.
9. Shoreline Protection near Hudson's Hope
 - Infilling below the high water mark along the north bank of the Peace River near Hudson's Hope for the purposes of armouring the bank and preventing erosion.
10. Filling of the Reservoir
 - Creation of an approximately 83 km long reservoir upstream of the dam site, converting riverine fish habitat to reservoir fish habitat.
11. Facility Operation
 - Operation of the generating station and infrequent operation of the spillways for the purpose of generating power from the facility. For the purposes of this Authorization, Facility Operation only includes normal operating conditions (i.e., when the Site C Reservoir is operated between the elevations of 460.0 - 461.8 masl measured at the dam using Geodetic Survey of Canada datum), and does not include potential serious harm to fish associated with works, undertakings or activities beyond normal operating conditions (e.g., non-routine maintenance, emergency events, or other factors).

The works, undertakings or activities listed above are more specifically described in the submission from the Proponent entitled "DFO – Application for Authorization Dam Construction, Reservoir Preparation, and Filling," (hereafter "the Application for Authorization") dated December 15, 2015 and produced for the British Columbia Hydro and Power Authority by Golder Associates Ltd., Ecofish Research Ltd., Limnotek Research and Development Inc., and BC Hydro.



The serious harm to fish likely to result from the proposed works, undertakings, or activities, and covered by this authorization includes:

1. Effects on fish habitat:

- Instream construction footprints of physical structures described in **Schedule B**, and estimated at a total of 86.35 ha.
- Interim changes to fish habitat from River Diversion will result in the creation of a headpond and alter riverine fish habitat along approximately 18 km of the Peace River upstream of the dam site, including the confluences of Peace River tributaries within this reach. This will be followed by filling and creation of the Site C Reservoir, which will result in inundation of approximately 2,800 ha of mainstem lotic habitat and 163 ha of tributary lotic habitat. The net residual serious harm to fish associated with filling of the Reservoir is difficult to quantify however, changes to fish habitat are anticipated to result in the loss of Arctic Grayling and a significantly depressed population of Peace River Mountain Whitefish. Predicted short-term and long-term biomass estimates in the reservoir are included in **Schedule C**.
- Construction of the Site C dam will shift the existing point of flow regulation (i.e., at the outlet of the Peace Canyon dam) by a distance of approximately 85 km downstream, and therefore increase the daily range of flows downstream of the Site C dam. During Facility Operation, daily flow regulation (predicted to range between 1.0-1.5 m) will result in repeated dewatering of some fish habitat along the river margins downstream of the Site C dam. This effect of flow regulation on fish habitat is anticipated to diminish downstream of the Pine River confluence, due to significant flow contributions from the Pine River and the Beatton River further downstream.

2. Effects to fish health and survival:

- Creation of the diversion headpond during River Diversion, and the subsequent filling and creation of the Site C Reservoir, is anticipated to result in the loss of distinct groups of fish that inhabit the existing riverine environment (e.g., Arctic Grayling and Peace River Mountain Whitefish).
- Stranding of fish and fish eggs is anticipated in the Peace River during River Diversion, as the diversion headpond is to be repeatedly dewatered.
- Fish entrained through the diversion tunnels during River Diversion and through the modified diversion tunnel during Reservoir Filling is likely to result in death of fish.
- Fish entrained through the generating station during Reservoir Filling and Facility Operations are anticipated to have a size-dependent survival rate estimated to be approximately 60% for large fish.
- Fish entrained through the spillways during Reservoir Filling and Facility Operations are anticipated to have a high rate of survival (likely >95%).
- Fish will be entrained through the generating station and spillways during Facility Operation. Annual entrainment rates were modelled by BC Hydro in its Fish Passage Management Plan (see **Schedule A**) to be <10% for the population for all fish species except for bull trout, kokanee, lake whitefish and lake trout. However, due to the fundamental changes in the aquatic ecosystem as a result of the creation of the reservoir fish movement patterns and entrainment risks may be greater than those modelled.
- Potential stranding of fish downstream of the dam site during Facility Operation due to flow regulation. Effects on fish from stranding are anticipated to occur largely in the reach between the dam site downstream to the Pine River, as the effects of flow regulation are anticipated to attenuate with inflows from the Pine River and the Beatton River further downstream.
- Potential stranding of fish in the reservoir during Facility Operation.
- Incidental mortality of fish during upstream fish passage by means of the temporary and permanent trap and haul facilities and associated sorting, sampling, transport and release. The acceptable level of incidental mortality is to be no more than 5% of the total number fish captured by the trap and haul facilities and associated sorting, sampling, transport, and release on an annual basis.



3. Effects on fish movement:
 - During River Diversion, Reservoir Filling, and Facility Operation upstream fish movement at the dam site will be blocked, and in combination with the anticipated habitat changes in the reservoir, will contribute to the decline of Arctic Grayling and Mountain Whitefish.

General Considerations

If information contained in the documents listed in **Schedule A** is in conflict with the Conditions of Authorization, the Conditions of Authorization shall supersede information in the aforementioned documents. In circumstances where the Proponent is seeking an extension to timelines identified in this authorization, or updating and/or revising documents referenced in **Schedule A**, the Proponent should provide DFO with the opportunity to review and comment on the documents, and is advised to notify potentially affected reservoir area Aboriginal groups and potentially affected immediate downstream area Aboriginal groups, as defined in the Decision Statement for the Site C Clean Energy Project, in a timely manner of these potential changes.

Conditions of Authorization

The above described works, undertakings or activities that are likely to result in serious harm to fish must be carried on in accordance with the following conditions.

1. **Conditions that relate to the period during which the work, undertaking or activity that will result in serious harm to fish can be carried on**

The work, undertaking or activity that results in serious harm to fish is authorized to be carried out during the following periods:

Project Construction Phase: From: **Date of Issuance** To: **December 31, 2026**

Facility Operations Phase: From: **January 1, 2022** To: **December 31, 2064**

If the Proponent cannot complete the construction works, undertaking or activities described in items 1-10 under the heading, "Description of Authorized works, undertakings or activities likely to result in serious harm to fish" during the Project Construction Phase, Fisheries and Oceans Canada (DFO) must be notified 3 months in advance of the expiration of the above time period. DFO may, where appropriate, provide written notice that the period to carry on the work, undertaking or activity has been extended.

The periods during which other conditions of this authorization must be complied with are provided in their respective sections below. DFO may, where appropriate, provide written notice that these periods have been extended, in order to correspond to the extension of the period to carry on a work, undertaking, or activity.

2. **Conditions that relate to measures and standards to avoid and mitigate serious harm to fish**

- 2.1 The Proponent shall ensure that the location and design of the works, undertakings or activities are consistent with the information included in the Application for Authorization (**see Schedule A**).
- 2.2 The Proponent shall maintain a minimum water flow release of 390 cubic metres per second from the Site C dam during Facility Operations.
- 2.3 The Proponent shall implement the measures and standards described below and as appropriate from the Fisheries and Aquatic Habitat Management Plan (**see Schedule A**) to avoid and mitigate serious harm to fish:
 - 2.3.1 Effective sediment and erosion control measures shall be installed before starting construction, and maintained during and after construction activities as appropriate to reduce the potential for introduction of sediment into watercourses.



- 2.3.2 In-water pile driving activities shall be monitored via hydrophone to ensure that underwater peak pressures do not result in serious harm to fish. Appropriate mitigation measures (e.g., bubble curtains) shall be implemented to avoid adverse impacts to fish.
 - 2.3.3 Intakes of any pumps shall be screened in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guidelines* (Fisheries and Oceans Canada 1995).
 - 2.3.4 Fish salvage and relocation shall be conducted prior to the start of construction activities so as to avoid and minimize adverse impacts to fish.
 - 2.3.5 Fish passage shall be maintained in fish bearing watercourses at all times excepting circumstances where natural flows, an authorized work, undertaking or activity, or construction of an offset precludes the passage of fish.
 - 2.3.6 Disturbed riparian areas shall be replanted where technically feasible and appropriate, with native non-invasive species of vegetation.
 - 2.3.7 Temporary structures installed below the high water mark shall be decommissioned and removed when they are no longer being used for construction purposes, unless retaining the structure can be demonstrated to DFO to reduce potential harm and/or provide a benefit to fish.
- 2.4 To mitigate effects on fish movement associated with construction and operation of the Project, the Proponent shall implement its Fish Passage Management Plan discussed within the Environmental Impact Statement Volume 2, Appendix Q1, and with further design information within Technical Memorandum No. T009 and P009 (see **Schedule A**) with any amendments approved by DFO.
- 2.5 If monitoring required in Condition 3 below indicates that the measures and standards to avoid and mitigate serious harm to fish are not effective, at the request of DFO, the Proponent shall in consultation with DFO identify additional measures and standards to avoid and mitigate the serious harm to fish caused by works, undertakings or activities authorized here-in, and where it is technically and economically feasible to do so, implement those additional measures or standards.

3. Conditions that relate to monitoring and reporting of measures and standards to avoid and mitigate serious harm to fish during the Project Construction Phase

- 3.1 Construction works, undertakings and activities shall be monitored on a systematic and on-going basis to ensure that standards and measures to avoid serious harm to fish are effective and that unauthorized serious harm to fish from works, undertakings or activities is avoided.
- 3.2 Monitoring of avoidance and mitigation measures: The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in Condition 2 of this authorization and provide a Quarterly monitoring report to DFO by March 31st, June 30th, September 30th, and December 31st respectively of each year unless otherwise agreed to by DFO. These monitoring reports must indicate whether the measures and standards to avoid and mitigate serious harm to fish were conducted according to the conditions of this authorization. This shall be done, by:
 - 3.2.1 Providing a concise summary of the works, undertakings or activities carried out or undertaken within that quarter.
 - 3.2.2 Providing commentary on the works, undertakings or activities, and the work area from an environmental perspective (e.g., fish observations, weather, and water quality).
 - 3.2.3 Demonstrating effective implementation and functioning of avoidance and mitigation measures: Providing dated photographs and inspection reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the serious harm to fish associated with each work, undertaking or activity covered by this authorization.
 - 3.2.4 Implementing contingency measures when necessary: Identification and photographic documentation of any environmental issues (e.g., potential non-compliance events) or impacts that arose or occurred in relation to fish and fish habitat, and details of any contingency measures that were followed to prevent impacts greater than those covered by this authorization in the event that mitigation measures did not function as described.



- 3.2.5 Demonstrating compliance with Environmental Protection Plans (EPPs): Reporting on compliance with EPPs pertaining to fish and fish habitat, including provision of copies of the relevant EPP(s) as appendices within the quarterly monitoring report(s).
- 3.2.6 Providing a table summarizing outstanding issues with respect to fish and fish habitat (those without on-the-spot solutions or those requiring follow-up to ensure corrective measures are being used), proposed/planned mitigation measures, priority and completion due-by date.
- 3.3 Proponent may request a variance in the aforementioned construction monitoring reporting requirements, which will be reviewed and may be accepted at the discretion of DFO.
4. **Conditions that relate to monitoring and reporting of measures and standards to avoid and mitigate serious harm to fish during the Facility Operations Phase**
 - 4.1 The Proponent shall undertake all the Monitoring Programs detailed within the Fisheries and Aquatic Habitat Monitoring and Follow-up Program (see **Schedule A**) that relate to Facility Operation, and shall in consultation with DFO develop additional monitoring programs (and associated reporting) if required to determine whether serious harm to fish is greater than anticipated in the Application for Authorization. The Proponent shall provide reports on the implementation of the Monitoring Programs in the Fisheries and Aquatic Habitat Monitoring and Follow-up Program that relate to Facility Operation to DFO annually by March 1 of the year following collection of monitoring data unless otherwise specified by DFO.
 - 4.2 If monitoring required in Condition 4.1 indicates that the measures and standards to avoid and mitigate serious harm to fish are not effective, at the request of DFO, the Proponent shall in consultation with DFO identify additional measures and standards to avoid and mitigate the serious harm to fish caused by the works, undertakings or activities authorized here-in, and where it is technically and economically feasible to do so, implement those additional measures or standards.
5. **Conditions that relate to the offsetting of the serious harm to fish likely to result from the authorized work, undertaking or activity**
 - 5.1 Letter of credit: Not required as the Proponent is an Agent of the Crown.
 - 5.2 The offsetting measures shall be implemented and/or constructed as described in Section 9.0 in the Application for Authorization. The offsetting measures include:
 - 5.2.1 Peace River channel contouring at Lower Site 109L and Main Channel Bar Excavation downstream of the dam site of not less than 68 ha in area, and side-channel enhancement at Site 108R of not less than 40 ha in area, via ‘cut and fill’ excavation and deposition, or via material extraction to reduce fish stranding and enhance rearing and foraging habitat for fish species including Mountain Whitefish, Arctic Grayling, Bull Trout, Rainbow Trout and Walleye;
 - 5.2.2 Reservoir shoreline enhancement works at five sites within the Site C reservoir (KM 22-24, KM 25-27, KM 34-35, KM 42-44 and KM 49-52KM) via contouring to increase littoral, backwater and shoal habitat for juvenile fish (likely Kokanee, Lake Whitefish, Rainbow Trout and Burbot) from:
 - i. a single spawning shoal of not less than 3.5 ha in area
 - ii. a single backwater channel of not less than 70 ha in area; and
 - iii. increased littoral habitat of not less than 33 ha in area.
 - 5.2.3 Incorporation of design features (e.g., boulder complexes) into the Hudson’s Hope shoreline protection works to create littoral fish habitat for fish species like Bull Trout and Rainbow Trout;
 - 5.2.4 Incorporation of fish habitat features, including spawning gravel and cobbles, in the final capping of the Relocated Surplus Excavated Material Sites (i.e., RSEM 5a of not less than 10 ha in area and RSEM L5 of not less than 4ha in area) within the reservoir immediately upstream of the dam site to provide enhanced littoral habitat for juvenile fish and spawning habitat for species such as Lake Whitefish, Kokanee, Bull Trout and Rainbow Trout;
 - 5.2.5 Planting of not less than 16 ha in area along the reservoir to provide riparian fish habitat (shading, cover, and nutrient inputs) and bank stabilization;
 - 5.2.6 An adaptive management approach proposed as part of the “Fisheries and Aquatic Habitat Monitoring and Follow-up Program” (see **Schedule A**) to support future mitigation and offsetting options after



reservoir creation based on follow-up monitoring. Specifically, implementation of tributary habitat enhancements identified under the Tributary Mitigation Opportunities Evaluation Program as described in the Fisheries and Aquatic Habitat Monitoring and Follow-up Program. Implementation of habitat enhancement opportunities resulting from the Tributary Mitigation Opportunities Evaluation Program will benefit stream dependent fish species which may include Arctic Grayling, Bull Trout, Burbot, Goldeye, Mountain Whitefish, Walleye, and Rainbow Trout. The scope, extent and implementation schedule of tributary enhancements is to be developed in consultation with and accepted by DFO after a review of the results of the Tributary Mitigation Opportunities Evaluation Program; and

- 5.2.7 Complementary measures as provided for within DFO's *Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting* (November 2013). Specifically, the Proponent shall conduct scientific research and gather information on fish and fish habitat for Arctic grayling, bull trout and mountain whitefish through biological monitoring of the status of these species as described in the Application for Authorization (**see Schedule A**).
- 5.3 As the designs and specifications of the aforementioned offsetting measures are preliminary, the Proponent commits to providing DFO with final design drawings 60 days prior to the start date of construction of the offsets. In addition, if a variance in the design of the offsetting measure is required, then the Proponent shall discuss the adequacy of the offsetting with DFO, and shall implement offsetting measures as deemed appropriate by DFO.
- 5.4 Contingency offsetting measures: If the results of monitoring as required in condition 6 indicate that the offsetting measures are not constructed by September 30, 2022 and/or are not functioning according to the criteria in 5.2 above and/or in Section 9.13 of the Application for Authorization, the Proponent shall give written notice to DFO and shall implement the following contingency measures to ensure the implementation of the offsetting measures is completed and/or functioning as required by this authorization:
 - 5.4.1 Additional main channel contouring and/or side channel enhancements in the Peace River similar to those described in subsection 5.2.1 and 5.2.2 of this authorization;
 - 5.4.2 Additional tributary enhancements within tributaries of the Peace River based on the results of the Tributary Mitigation Opportunities Evaluation Program
- 5.5 Should the contingency offsetting measures described above be required, an associated effectiveness monitoring program similar to that described in Section 9.12 of the Application for Authorization shall be developed by the Proponent in consultation with DFO to ensure that offsetting contingency measures are completed and/or functioning as intended.
- 5.6 The Proponent shall not carry on any work, undertaking or activity that will adversely disturb or impact the offsetting measures.

6. Conditions that relate to monitoring and reporting of implementation of offsetting measures (described above in Condition 5)

- 6.1 Schedule(s) and criteria: The Proponent shall conduct monitoring of the implementation of offsetting measures according to the effectiveness monitoring program described in Section 9.12 of the Application for Authorization, the key elements of which are described detail within the Proponent's "Fisheries and Aquatic Habitat Monitoring and Follow-up Plan". Any changes to the monitoring plans required by this Authorization shall be developed by the Proponent in consultation with DFO.
- 6.2 The implementation of the effectiveness monitoring program shall occur as per the schedule provided in Figure 12 of the Application for Authorization (attached as **Schedule D**). Any variance from this schedule shall only occur if deemed appropriate by DFO, at which time the Proponent shall provide an updated schedule to DFO.
- 6.3 The Proponent shall provide an annual effectiveness monitoring report to DFO which shall:
 - 6.3.1 Provide a detailed summary of the offsetting measures monitored during that calendar year, and an anticipated schedule of construction of offsetting measures and future monitoring activities associated with the offsetting measures;



- 6.3.2 Provide a detailed report on the effectiveness of the implementation and functioning of each offsetting measure monitored, including dated photographs and inspection reports to demonstrate effective implementation and functioning of offsetting measures described above in 5.2 of this Authorization.
- 6.3.3 Provide identification and photographic documentation of any environmental issues (e.g., potential non-compliance events) or impacts to fish and fish habitat that arose or occurred in relation to implementation or functioning of offsetting measures, and details of any associated measures that were implemented in response.
- 6.4 Provide an annual report summarizing the results of each individual monitoring program described within the Effectiveness Monitoring Program (i.e., from Section 9.12 of the Application for Authorization) per the specifications described for each monitoring program within the “Fisheries and Aquatic Habitat Monitoring and Follow-up Plan”.

7. Supplementary measures

- 7.1 The extent, duration, and magnitude of effects on the aquatic ecosystem as the result of the proposed works, undertakings or activities are significant and have associated uncertainty in terms of outcomes. As a result, long term monitoring of the aquatic ecosystem will be necessary to inform appropriate adaptive management measures to ensure the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. As such, supplementary or other measures may be required should monitoring results indicate that the residual impacts to fish and fish habitat are greater than those that have been authorized and/or to address the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Therefore, taking into account the results of monitoring (i.e., Conditions 3, 4, and 6 above) and DFO’s assessment of impacts to commercial, recreational or Aboriginal fisheries, DFO may require that the Proponent implement supplementary or other measures.
- 7.2 With the goal of supporting meaningful engagement and information sharing about the Project activities with Aboriginal groups (as defined under ‘General Considerations’), the Proponent, in consultation with the Department of Fisheries and Oceans and Aboriginal groups with rights to harvest in the area affected by the authorized works, undertakings or activities, shall:
 - 7.2.1 Collaborate with these Aboriginal groups to:
 - i. develop, implement, and manage a plan to monitor the conditions in this Authorization;
 - ii. identify and develop ways to protect and improve aquatic species and their habitats, including additional mitigation measures to address impacts to current use of fisheries resources for traditional purposes; and
 - iii. share information about the Project activities with Aboriginal groups.
 - 7.2.2 Establish committees and/or mechanisms for dialogue amongst the Proponent, Aboriginal groups, and the governments of Canada and British Columbia on additional ways to mitigate the impacts of the project;
 - 7.2.3 Notify without delay Aboriginal groups of an occurrence that results in serious harm to fish or which poses a serious and imminent danger of such an occurrence, and which is not captured by this Authorization; and
 - 7.2.4 Provide funds to Aboriginal groups to support their capacity to carry out conditions 7.2.1 to 7.2.3 above. Details on the implementation of this condition are to be discussed with DFO.
- 7.3 The supplementary or other measures described in 7.1 and 7.2 will be implemented within a time period and on a schedule determined in consultation with DFO.



Authorization Limitations and Application Conditions

The Proponent is solely responsible for plans and specifications relating to this authorization and for all design, safety and workmanship aspects of all the works associated with this authorization.

The holder of this authorization is hereby authorized under the authority of Paragraph 35(2)(b) of the *Fisheries Act*, R.S.C., 1985, c.F. 14 to carry on the work(s), undertaking(s) and/or activity(ies) that are likely to result in serious harm to fish as described herein. This authorization does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

This authorization does not permit the deposit of a deleterious substance in water frequented by fish. Subsection 36(3) of the *Fisheries Act* prohibits the deposit of any deleterious substances into waters frequented by fish unless authorized by regulations made by Governor in Council.

This authorization does not permit the killing, harming, harassment, capture or taking of individuals of any aquatic species listed under the *Species at Risk Act* (SARA) (s. 32 of the SARA), or the damage or destruction of residence of individuals of such species (s. 33 of the SARA) or the destruction of the critical habitat of any such species (s. 58 of the SARA).]

The failure to comply with any condition of this authorization constitutes an offence under Paragraph 40(3)(a) of the *Fisheries Act* and may result in charges being laid under the *Fisheries Act*.

This authorization must be held on site and work crews must be made familiar with the conditions attached.

This authorization cannot be transferred or assigned to another party. If the work(s), undertaking(s) or activity(ies) authorized to be conducted pursuant to this authorization are expected to be sold or transferred, or other circumstances arise that are expected to result in a new Proponent taking over the work(s), undertaking(s) or activity(ies), the Proponent named in this authorization shall advise DFO in advance.

AUG 23 2016

Date of Issuance: _____

Approved by: _____

Rebecca Reid
Regional Director General
Pacific Region
Fisheries and Oceans Canada



Schedule A – Reference Documents

Application Form for Paragraph 35(2)(b) *Fisheries Act* Authorization (Normal Circumstances) completed by Brent Mossop of the British Columbia Hydro and Power Authority, and dated December 15, 2015.

DFO – Application for Authorization Dam Construction, Reservoir Preparation, and Filling, dated December 15, 2015 and produced for the British Columbia Hydro and Power Authority by Golder Associates Ltd., Ecofish Research Ltd., Limnotek Research and Development Inc., and BC Hydro.

Fisheries and Aquatic Habitat Management Plan, (Revision 1) produced for the British Columbia Hydro and Power Authority by Dave Hunter and Brent Mossop, and dated June 1, 2015.

Fisheries and Aquatic Habitat Monitoring and Follow-up Program: Site C Clean Energy Project, produced for the British Columbia Hydro and Power Authority by Dave Hunter, Brent Mossop, Dustin Ford, Eric Parkinson, Michael McArthur, and Don McCubbing, and dated December 22, 2015.

Site C Clean Energy Project, Dam Construction, Reservoir Preparation and Filling: Environmental Analysis of Physical Fish Habitat Offsets, produced by the British Columbia Hydro and Power Authority dated June 24, 2016.

Site C Clean Energy Project – Environmental Impact Statement (and Appendices), produced by the British Columbia Hydro and Power Authority, as amended July 19, 2013.

Technical Memorandum No. T009 – Site C Clean Energy Project – Temporary Upstream Fish Passage Recommended Alternative Summary Status Update. Included in the Water Licence Application for the Site C fish passage facilities (Application Tracking Number: 100125862), and provided via email to B. Naito, DFO in June 2015.

Technical Memorandum No. P009 - Site C Clean Energy Project – Permanent Upstream Fish Passage Recommended Alternative Summary Status Update. Included in the Water Licence Application for the Site C fish passage facilities (Application Tracking Number: 100125862), and provided via email to B. Naito, DFO in June 2015.



Schedule B – Instream Construction Footprint of Project Components Likely to Result in Residual Effects to fish and fish habitat

Project Component	Footprint (ha)
North Bank Stage 1 Cofferdam (including isolated/dewatered area)	15.36
Diversion Inlet Cofferdam and Channel	4.65
Diversion Outlet Cofferdam and Channel	2.58
Stage 2 Cofferdams (including isolated/dewatered areas)	18.92
Earthfill Dam	0.16
RSEM L5	19.78
RSEM L6	2.26
Hudson's Hope Shoreline Protection	4.44
Highway 29 Realignment (east of Lynx Creek)	14.83
Moberly River Construction Bridge	3.37
Totals	86.35



Schedule C – Predicted changes to fish biomass upstream and downstream of the Site C Dam

TABLE 2: Short and longer term predictions of fish biomass (t) for pre-project (Peace River from Peace Canyon Dam to the dam site) and post-project (Site C Reservoir) conditions. Fish biomass is presented for the “Most Likely” scenario.

Group	Species Name	Current (Pre-Project) biomass (river) (t)	SHORT TERM (IN 10 YRS)			LONGER TERM (> 30 YRS)		
			Post-project biomass (Reservoir) (t)			Post-project biomass (Reservoir) (t)		
			Most Likely	Range (min - max)		Most Likely	Range (min - max)	
1	Walleye	0.15	0	0 - 0	0	0 - 0		
1	Lake Trout	0	0.03	0.01 - 0.04	0.04	0.01 - 0.06		
1	Rainbow Trout	1.64	1.93	1.29 - 2.58	1.93	1.34 - 2.58		
1	Northern Pike	0.09	0.23	0.12 - 0.46	0.46	0.12 - 0.93		
1	Burbot	0.01	0.05	0.02 - 0.1	0.1	0.05 - 0.1		
	Group 1 Subtotal	1.89	2.24	1.44 - 3.18	2.53	1.52 - 3.67		
2	Bull Trout	2.97	3.07	1.35 - 4.37	5.52	1.76 - 6.96		
2	Arctic Grayling	1.28	0	0 - 0.1	0	0 - 0.1		
2	Mountain Whitefish	11.07	0.79	0.16 - 1.58	0.79	0.17 - 1.58		
	Group 2 Subtotal	15.32	3.87	1.51 - 6.05	6.31	1.92 - 8.64		
3	Kokanee	0.08	11.2	3.36 - 14.56	22.4	6.72 - 29.13		
3	Lake Whitefish	0	0.53	0.34 - 0.93	0.11	0.02 - 0.43		
	Group 3 Subtotal	0.08	11.73	3.7 - 15.49	22.51	6.74 - 29.55		
	Total Harvestable Fish Biomass	17.29	17.84	6.64 - 24.72	31.35	10.19 - 41.85		
4	Suckers	8.19	25.23	10.09 - 50.46	25.24	11.11 - 50.46		
4	Small Fish	0.38	1.23	0.49 - 2.46	1.23	0.53 - 2.46		
4	Northern Pikeminnow	0.49	0.12	0.04 - 0.2	0.12	0.04 - 0.2		
	Group 4 Subtotal	9.06	26.58	10.63 - 53.13	26.59	11.68 - 53.13		
	Total Fish Biomass	26.35	44.42	17.27 - 77.85	57.94	21.87 - 94.98		



TABLE 3: Short and longer term predictions of fish biomass (t) for pre- and post-Project conditions for the Peace River from the Project to Many Islands, AB. Fish biomass is presented for the “Most Likely” scenario.

Group	Species Name	Current (Pre-Project) biomass (river) (t)	SHORT TERM (IN 10 YRS)			LONGER TERM (> 30 YRS)		
			Post-project biomass (Peace River Downstream of Site C Dam) (t)			Post-project biomass (Peace River Downstream of Site C Dam) (t)		
			Most Likely	Range (min - max)		Most Likely	Range (min - max)	
1	Walleye	3.38	1.69	0.34 - 1.69	1.69	0.34 - 1.69		
1	Lake Trout	0	0	0 - 0.01	0	0 - 0.01		
1	Rainbow Trout	0.17	0.35	0.17 - 0.35	0.35	0.17 - 0.35		
1	Northern Pike	0.74	0.37	0.37 - 0.74	0.37	0.37 - 0.74		
1	Burbot	0.1	0.05	0.01 - 0.05	0.05	0.01 - 0.05		
	Group 1 Subtotal	4.39	2.46	0.89 - 2.83	2.46	0.89 - 2.83		
2	Bull Trout	1.49	1.23	1.23 - 2.54	1.23	1.23 - 2.54		
2	Arctic Grayling	0.64	0.32	0.06 - 0.64	0.32	0.06 - 0.64		
2	Mountain Whitefish	7.38	14.74	14.74 - 14.74	14.74	14.74 - 14.74		
	Group 2 Subtotal	9.5	16.29	16.03 - 17.91	16.29	16.03 - 17.91		
3	Kokanee	0.03	0.01	0 - 0.02	0.03	0.01 - 0.04		
3	Lake Whitefish	0	0.01	0 - 0.01	0	0 - 0.01		
	Group 3 Subtotal	0.03	0.02	0.01 - 0.03	0.03	0.01 - 0.04		
	Total Harvestable Fish Biomass	13.93	18.77	16.94 - 20.78	18.78	16.94 - 20.79		
4	Suckers	21.74	10.87	10.87 - 10.87	10.87	10.87 - 10.87		
4	Small Fish	0.87	0.7	0.43 - 0.87	0.7	0.43 - 0.87		
4	Northern Pikeminnow	0.87	0.44	0.26 - 0.52	0.44	0.26 - 0.52		
	Group 4 Subtotal	23.49	12.01	11.57 - 12.27	12.01	11.57 - 12.27		
	Total Fish Biomass	37.42	30.78	28.5 - 33.05	30.79	28.5 - 33.06		



Schedule D – The Proponent’s Offset Plan Implementation Schedule

Site C Clean Energy Project	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 - 2053			
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 1 - 30			
	Construction				Construction				Construction				Operation
Dependent Milestones	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Operation		
Construction - Major Components					Diversion			Start Reservoir Filling	Complete Reservoir Filling	Start of Operations	All units in Service		
Offset Measures													
Peace River Channel Contouring and Side Channel Enhancement													
Reservoir Shoreline Enhancement													
Hudson's Hope Shoreline Protection Enhancement													
Dam Site Material Relocation Site Enhancement													
Reservoir Shoreline Riparian Planning													
Fisheries and Aquatic Habitat Monitoring and Follow-up Programs													
Site C Construction Phase Monitoring - Peace River Downstream of Site C Dam													
Site C Operations Phase Monitoring - Peace River Downstream of Site C Dam													
Site C Construction Phase Monitoring - Peace River Upstream of Site C Dam													
Site C Operations Phase Monitoring - Site C Reservoir													
Tributary Mitigation Opportunities Evaluation Program													
Arctic Graveling Monitoring													
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 - 2053			
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 1 - 30			
	Construction				Construction				Construction				Operation
	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Operation		